

LhARA Transformative Healthcare Technologies second call

Outline proposal, case for support

5 pages

A. Research Vision and Ambition

- *Vision of full LhARA initiative;*
- *LhARA as demonstrator.*

B. National Importance

- *Clinical impact*
- *Technological impact*
- *Industrial impact*
- *Scientific impact*

C. Application co-creation

- *Consortium*
- *Technical status; requirements (i.e. end-station, dose-deposition imaging, impact assessment)*
- *LhARA initiative:*
 - **Full programme; now to full implementation**
 - **(Full) 5-yr programme outline**
- *THT Phase 1 proposal:*
 - **End station “pre-CDR”:** **Co-ord: Tony Price & Ruth McLauchlan**
 - Requirements, outline engineering; [*in vitro/in vivo* JPar/YP]
 - Dosimetry of intense, short-pulse beam
 - QA and Beam Monitoring
 - Incremental detector developments, BPMs, SciFibres, silicon
 - Key development Photoacoustic imaging electronics to compliment beam developments
 - Irradiations and positioning
 - RFI cell imaging capabilities.
 - We provide samples irradiated in novel ways and RFI image
 - 3D automated robotics (Christie like);
 - Automatic 3D positioning;
 - **Dose-deposition imaging:** **Co-ord: Jeff Bamber (& Paul Beard ?)**
 - Review of options, evaluation to be carried out in 9-15 month period
 - Simulations of energy deposition (benefit over photons)
 - “Proto-acoustic” imaging:
 - Principle, state of the art, requirements for development
 - Proposal for proof-of-principle system
 - **Evaluation of benefits that will accrue from the LhARA initiative:** **Co-ord: Pat Price (?)**
 - Concrete, measurable benefits; i.e. in £k and/or “adjusted patient life years”;
 - Optimisation of LhARA specification and/or R&D programme to maximise quantifiable benefits
 - RFI: benefits of programme to biology and medicine
 - **Deliverables:**
 - Pre-CDR: CCAP TN and, possibly, publication
 - Proposal for proof-of-principle “proto-acoustic” imaging experiment and, possibly, publication

- Benefits analysis: included in pre-CDR or stand-alone TN and, possibly, publication
- Phase 2 proposal
- ***Stakeholder engagement plan:***
 - **PPI – summary of strategy being prepared by GJ and HH (to be discussed at SG);**
 - **Clinician – summary of strategy to be developed (StuG to be discussed at SG)**
 - **Industry – summary of strategy to be developed (F.Jamieson, S.Towe to be developed)**
 - **UKRI – EPSRC, MRC, STFC; i.e. development of programme, co-ownership of risk**
- ***Governance framework:***
 - **E.g. STFC co-fund; stakeholder analysis; oversight;**